

WHAT IS CLAIMED IS:

1 1. A multicolor display comprising
2 a substrate; and
3 at least one multicolor generation site coupled to said substrate, each of
4 said at least one multicolor generation sites comprised of:
5 at least two light emitting regions proximate to one another; and
6 at least one wavelength conversion layer applied to at least one of
7 said at least two light emitting regions, wherein said at least two light emitting
8 regions in combination with said at least one wavelength conversion layer emit at
9 least two different colors.

1 2. A multicolor display comprising
2 a substrate; and
3 a multicolor generation site grown on said substrate comprising:
4 at least two LEDs proximate to one another; and
5 a first wavelength conversion layer applied to a light emitting
6 surface of a first of said at least two LEDs, wherein said at least two LEDs in
7 combination with said first wavelength conversion layer emit at least two different
8 colors.

1 3. The multicolor display of claim 2, wherein said at least two LEDs
2 are comprised of three individual LEDs proximate to one another.

1 4. The multicolor display of claim 3, further comprised of a second
2 wavelength conversion layer applied to a light emitting surface of a second of said three
3 individual LEDs, wherein said three individual LEDs in combination with said first and
4 second wavelength conversion layers emit three different colors.

1 5. The multicolor display of claim 2, wherein said at least two LEDs
2 emit light at a wavelength in the range of wavelengths between 4,000 and 4,912
3 Angstroms.

1 6. A multicolor display comprising

2 a substrate; and
3 a plurality of multicolor generation sites grown on said substrate, each of
4 said plurality of multicolor generation sites comprised of:
5 at least two LEDs proximate to one another; and
6 a wavelength conversion layer deposited on a light emitting surface
7 of a first of said at least two LEDs, wherein said at least two LEDs in combination
8 with said wavelength conversion layer emit at least two different colors.

1 7. The multicolor display of claim 6, further comprising an index
2 matching layer interposed between said wavelength conversion layer and said light
3 emitting surface of said first LED.

1 8. The multicolor display of claim 6, further comprising a protective
2 layer deposited on an exterior surface of said wavelength conversion layer.

1 9. The multicolor display of claim 6, further comprising a protective
2 layer deposited on a light emitting surface of a second of said at least two LEDs.

1 10. The multicolor display of claim 6, further comprising a region of
2 opaque material deposited between said at least two LEDs.

1 11. The multicolor display of claim 6, wherein said substrate is
2 selected from the group consisting of sapphire, silicon carbide and gallium nitride.

1 12. The multicolor display of claim 6, wherein said at least two LEDs
2 emit light at a wavelength in the range of wavelengths between 4,000 and 4,912
3 Angstroms.

1 13. The multicolor display of claim 6, further comprising a cross-talk
2 minimization layer interposed between said substrate and said at least two LEDs.

1 14. The multicolor display of claim 13, wherein said cross-talk
2 minimization layer is comprised of a Bragg reflector.

1 15. The multicolor display of claim 13, wherein said cross-talk
2 minimization layer is comprised of a partially absorbing layer.

1 16. A multicolor display comprising

2 a substrate; and
3 a plurality of multicolor generation sites grown on said substrate, each of
4 said plurality of multicolor generation sites comprised of:
5 three LEDs proximate and immediately adjacent to one another;
6 a first wavelength conversion layer deposited on a light emitting
7 surface of a first of said three LEDs; and
8 a second wavelength conversion layer deposited on a light emitting
9 surface of a second of said three LEDs, wherein said three LEDs in combination
10 with said first and second wavelength conversion layers emit three different
11 wavelengths.

1 17. The multicolor display of claim 16, wherein said substrate is
2 selected from the group consisting of sapphire, silicon carbide and gallium nitride.

1 18. The multicolor display of claim 16, wherein said first and second
2 wavelength conversion layers are selected from the group of materials consisting of
3 phosphors and active polymers.

1 19. The multicolor display of claim 16, wherein said three LEDs emit
2 light at a wavelength in the range of wavelengths between 4,000 and 4,912 Angstroms.

1 20. The multicolor display of claim 16, wherein said first wavelength
2 conversion layer converts light in a first wavelength range of between 4,000 and 4,912
3 Angstroms to light in a second wavelength range of between 4,912 and 5,750 Angstroms.

1 21. The multicolor display of claim 16, wherein said second
2 wavelength conversion layer converts light in a first wavelength range of between 4,000
3 and 4,912 Angstroms to light in a second wavelength range of between 6,470 and 7,000
4 Angstroms.

1 22. The multicolor display of claim 16, further comprising:
2 a first index matching layer interposed between said first wavelength
3 conversion layer and said light emitting surface of said first LED; and
4 a second index matching layer interposed between said second wavelength
5 conversion layer and said light emitting surface of said second LED.

1 23. The multicolor display of claim 16, further comprising:
2 a first protective layer deposited on an exterior surface of said first
3 wavelength conversion layer; and
4 a second protective layer deposited on an exterior surface of said second
5 wavelength conversion layer.

1 24. The multicolor display of claim 23, wherein said first and second
2 protective layers are equivalent layers.

1 25. The multicolor display of claim 23, further comprising a third
2 protective layer deposited on a light emitting surface of a third of said three LEDs.

1 26. The multicolor display of claim 16, further comprising a region of
2 opaque material deposited between adjacent surfaces of said three LEDs.

1 27. The multicolor display of claim 16, further comprising:
2 a plurality of channels within said substrate, said plurality of channels
3 separating adjacent LEDs of said three LEDs; and
4 opaque material deposited within said plurality of channels.

1 28. The multicolor display of claim 16, further comprising a cross-talk
2 minimization layer interposed between said substrate and said at least two LEDs.

1 29. The multicolor display of claim 28, wherein said cross-talk
2 minimization layer is comprised of a Bragg reflector.

1 30. The multicolor display of claim 28, wherein said cross-talk
2 minimization layer is comprised of a partially absorbing layer.

1 31. A method of fabricating an active, multicolor display, comprising
2 the steps of:
3 defining a plurality of multicolor generation sites on a single substrate;
4 growing at least two LEDs on said substrate at each of said plurality of
5 multicolor generation sites; and
6 depositing a wavelength conversion layer on a light emitting surface of at
7 least one of said at least two LEDs at each of said plurality of multicolor generation sites.

1 32. A method of fabricating an active, multicolor display, comprising
2 the steps of:
3 defining a plurality of multicolor generation sites on a single substrate;
4 growing three LEDs on said substrate at each of said plurality of
5 multicolor generation sites;
6 depositing a first wavelength conversion layer on a light emitting surface
7 of a first of said three LEDs at each of said plurality of multicolor generation sites; and
8 depositing a second wavelength conversion layer on a light emitting
9 surface of a second of said three LEDs at each of said plurality of multicolor generation
10 sites.

1 33. The method of claim 32, further comprising the steps of:
2 depositing a first index matching layer on said light emitting surface of
3 said first of said three LEDs at each of said plurality of multicolor generation sites prior to
4 depositing said first wavelength conversion layer; and
5 depositing a second index matching layer on said light emitting surface of
6 said second of said three LEDs at each of said plurality of multicolor generation sites
7 prior to depositing said second wavelength conversion layer.

1 34. The method of claim 32, further comprising the steps of:
2 depositing a first protective layer on an exterior surface of said first
3 wavelength conversion layer; and
4 depositing a second protective layer on an exterior surface of said second
5 wavelength conversion layer.

1 35. The method of claim 34, further comprising the step of depositing
2 a third protective layer on a light emitting surface of a third of said three LEDs at each of
3 said plurality of multicolor generation sites.

1 36. The method of claim 32, further comprising the step of depositing
2 an opaque material between a plurality of edge portions of said three LEDs at each of said
3 plurality of multicolor generation sites.

1 37. The method of claim 32, further comprising the step of interposing
2 a cross-talk minimization layer between said substrate and said three LEDs at each of said
3 plurality of multicolor generation sites.

1 38. The method of claim 32, further comprising the step of interposing
2 a distributed Bragg reflector between said substrate and said three LEDs at each of said
3 plurality of multicolor generation sites.

1 39. The method of claim 32, further comprising the step of selecting
2 said first wavelength conversion layer to convert light in a first wavelength range of
3 between 4,000 and 4,912 Angstroms to light in a second wavelength range of between
4 4,912 and 5,750 Angstroms.

1 40. The method of claim 32, further comprising the step of selecting
2 said first wavelength conversion layer to convert light in a first wavelength range of
3 between 4,000 and 4,912 Angstroms to light in a second wavelength range of between
4 6,470 and 7,000 Angstroms.